ERASMUS UNIVERSITEIT ROTTERDAM

Drivers of Merger and Acquisition Activities in the US Market
A Dynamic Approach

Bachelor Thesis

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1. Introduction

The two ways firms can expand their business are organic growth and inorganic growth. Organic growth is based on firms' internal investments, which aim to increase a company's outputs and enhance its sales (Bruner, 2004). On the other hand, inorganic growth can be accomplished through investments or structuring a partnership outside the business (Bruner, 2004). A decision to grow organically or inorganically is a choice about "make" versus "buy". There are several strategies which a company can pursue in order to grow inorganically, such as merger or acquisition, minority investment, joint venture, strategic alliance and contractual relationship (Bruner, 2004). This paper will investigate inorganic growth strategies, focusing the analysis on M&A activity, which is defined as mergers and acquisitions[1] where bidders are US-based companies that acquire US or foreign target firms. Thus, the geographic area of interest is represented by the United States of America. The choice of the selected geographical area, is related to the importance of the M&A activity in the US region, which accounted for 1 trillion of USD in 2011, roughly 30 per cent of the world's M&A volume (Qiu, 2012). As Graph 1 shows below, the Americas currently represent the biggest share of the worldwide mergers and acquisitions business (Qiu, 2012).

Graph1: M&A Importance Per Region, 2011
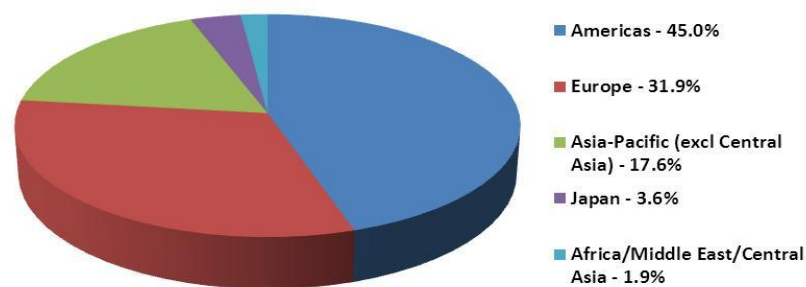
Source: retrieved from Qiu (2012)

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[1] When one company acquires another company becoming the owner of the combined entity, the transaction is called an acquisition. In this case the target company, which has been acquired stops to exist. On the other hand, a merger is a transaction where two firms organize themselves as a new single company, thus the two merged entities no longer exist and a new company is created.

In addition to this, another advantage which supports the choice of investigating M&A deals in the US area, is supported by the availability of data which makes the topic researchable, as most of the companies, public and private, that will be analyzed, have their data publicly available.

There are several reasons why firms may decide to grow externally rather than internally. Under a strategic point of view the five main drivers of inorganic growth are: maturing product line, regulatory or antitrust limits, value creation through horizontal and vertical integration, acquisitions of resources and capabilities and value creation through diversification (Bruner, 2004). According to the bidding firm view point, to acquire a target firm in the same area of business the acquirer operates, is faster than growing internally, because the target is an organization already established with its product capacity, clientele and networking (Gaughan, 2010). External growth also reduces the risk of investing in a new line of business, since the target company has already experience in the particular field. Furthermore, growing through M&As might be cheaper compared to organic strategies, especially when the market value of the target's assets is lower than the replacement cost of the assets (Luypaert & Huyghebaert, 2010). In addition to this, a merger or an acquisition can not only be financed by cash, but also by issuing new stocks, which is an alternative strategy, in case of lack of liquidity, debt capacity, or both.

As mergers and acquisitions might be driven by several explanatory factors, this paper investigates what are the reasons why a bidding firm decides to grow through M&As. Specifically the analysis will focus on what bidder characteristics, industry and market variables play a role in the firm decision to engage in M&A activities.

As scientific research supports, M&As happen in waves. Academics recognize 6 major waves in history of M&As (Qiu, 2012). As we can see from Graph 2 below, which measures the worldwide M&As by value from 1980-2011, it is possible to clearly identify the 4th wave, in the 1980s, the 5th wave, from 1992 to 2000, and the 6th wave, which goes from 2003 to 2007. The graph does not report the 1st , 2nd and 3rd waves which determine the periods 1897-1904, 1916-1929 and 1960s respectively. Every wave was characterized by the type of M&As that took place in the specific period. The 1st wave was subject to horizontal mergers, which suggest how firms, operating at the same level of the supply chain in the same industry, merged in order to achieve a monopoly situation in the industry of interest (Bruner, 2004). The 2nd wave was subject to vertical mergers, which suggest how firms, operating at different levels of the supply chain in the same industry, merged to achieve an oligopoly situation in the industry of interest (Bruner, 2004). The 3rd wave was subject to conglomerate mergers, which saw the activity focused around several corporate

groups of two or more firms, known as conglomerates (Bruner, 2004). The 4th wave was subject to aggressive activity, mostly leverage financed, where hostile takeovers and leveraged buyouts took place (Bruner, 2004). The 5th wave saw a sharp increase of M&A activity in all industries. This prosperous period mainly involved friendly and cross-border mergers, which resulted in the creation of many multinational conglomerates. The decline was eventually experienced in 2000 with the burst of the dot-com bubble (Qiu, 2012). The 6th wave was mainly represented by the booming of private equity deals as well as leveraged buyouts, which eventually declined when the start of the financial crisis took place in 2007 (Qiu, 2012).

**Graph 2: Worldwide M&As by Value, 1980-2011**
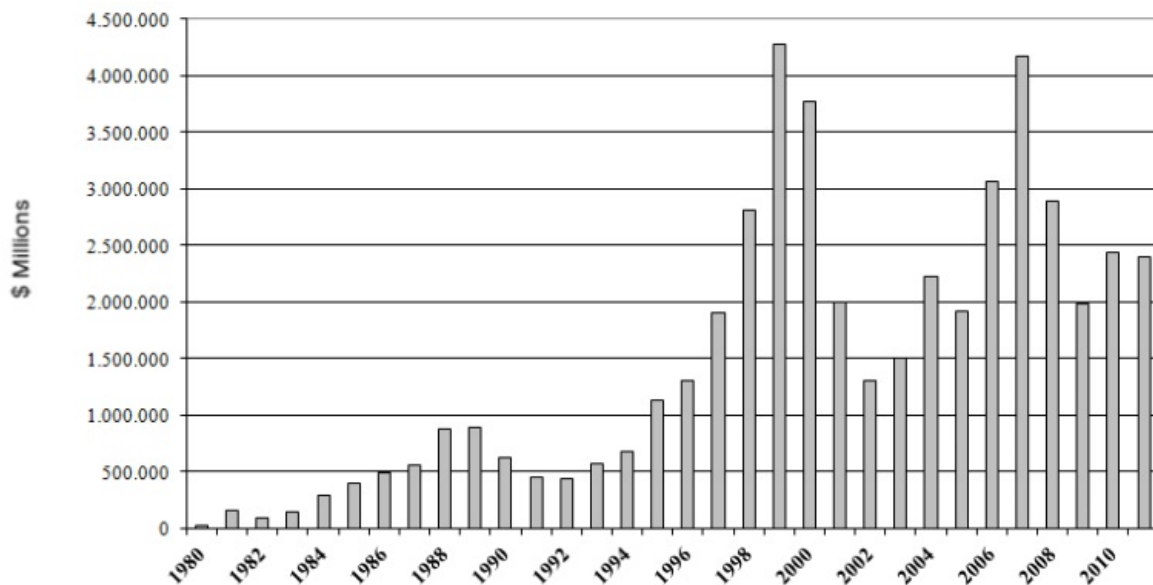
Source: Thomson One Banker

As the paper focuses its analysis on the US area, it is worth mentioning how the recent M&A activity in the United States reflects, in a smaller scale, the same pattern the worldwide M&A activity has. This can be noticed by comparing Graph 3 below, which shows United States M&As by value from 1980 to 2009, with Graph 2 above.

Graph 3: United States M&As by Value, 1980-2009
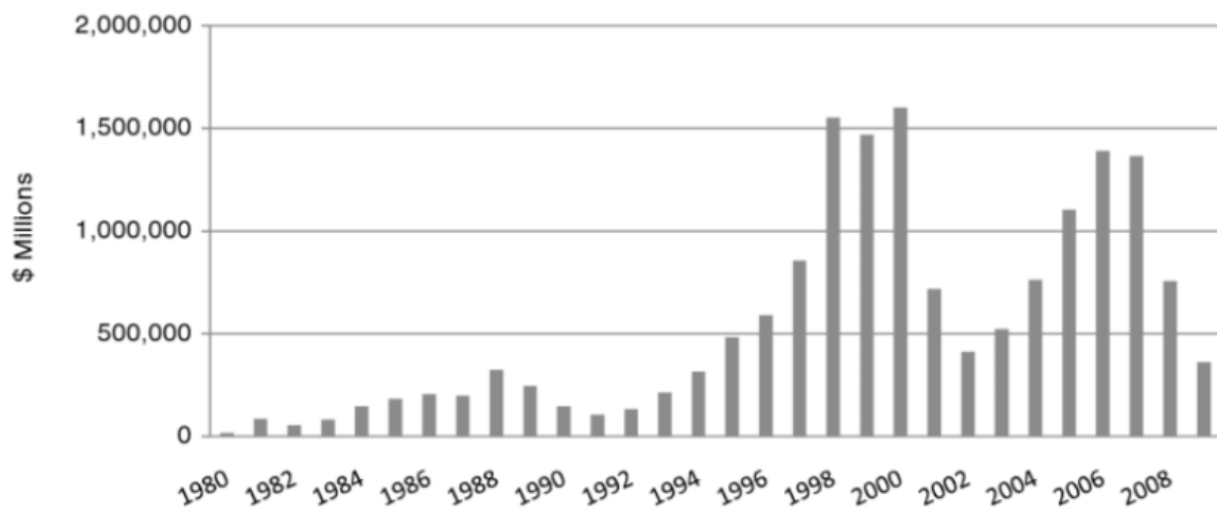
Source: Thomson Financial

Ultimately, the purpose of this study is to shed light on what role M&A drivers play, in the period that follows the break out of the financial crisis, which goes from 2008 till 2011. The existing literature so far fails to analyze M&A drivers in the aforementioned period, and barely concentrates on bidding companies characteristics in the selected period. Thus, the article main contribution to the literature is to study how M&A drivers react in the period after the break out of the financial crisis, aiming to provide fruitful insights for future research on this topic. The drivers of M&A activities, which will be used in the paper, are suggested from the extensive literature that supports the topic of research. These drivers, accordingly selected, are managerial motives and governance, synergies, market power and industry shocks (Luypaert & Huyghebaert, 2010). The research will thus investigate the relation between the aforementioned drivers and the decision of a firm to expand through M&As. The analysis, guides to the following research question: *What drivers explain whether firms decide to grow externally versus internally, and what is the explanation behind the revealed relation in the US market?*

The remainder of this paper is organized as follows: Chapter 2 will present the theoretical framework and prior empirical research, providing an overview of the hypotheses concerning the external growth decision through M&As. Chapter 3 will present the methodology and data used in

the research, particularly focusing on the sample of data. Chapter 4 will introduce and explain the results of the analysis carried out throughout the research, and Chapter 5 will summarize and conclude the paper.

2. Theory and Prior Empirical Research

2.1. Introduction

In this chapter the theoretical framework will be introduced and explained. As the research question states, the relation between M&A drivers and the decision of a firm to expand externally through mergers and/or acquisitions will be examined. Concerning the subject treated, scholars developed numerous theories which may explain why firms decide to expand inorganically through M&As (Gaughan, 2010). Such theories exhibit insights concerning all the explanatory variables that will be used to explain what influences the decision to engage in M&A activity. The explanatory variables, which represent the M&A drivers, will be introduced one by one, thereafter, with the support of prior empirical research, corresponding hypotheses will be developed to assume how bidder characteristics, industry and market conditions might influence the decision of a firm to expand through M&As.

2.2. Hypothesis – Managerial Motives and Governance

Previous studies, Jensen (1986) and Roll (1986), argued that managerial motives and hubris might be related to inorganic growth strategy. The hubris hypothesis arises when managers think their own valuations are superior to the market (Bruner, 2004). On the other hand, managerial motives might be linked to agency problems, which have an impact on companies' corporate governance (Bruner, 2004). Agency problems surge when managers create a situation of conflict of interests with the shareholders of the company (Gaughan, 2010). Concerning agency problems, two hypotheses are particularly relevant: managerialism and empire building. The managerialism hypothesis arises when managers might pursue a growth strategy, to increase their managerial power and compensation (Qiu, 2012). Similarly, the empire building hypothesis[2] might lead firms to expand beyond their optimal size, hurting shareholders benefit. Another reason which might trigger managerial expansion motives, concerns the willingness to diversify the sources of income of the firm, and reduce its risk, which might drive managers to acquire target companies, which belong to non-related industries or to engage in cross-borders acquisitions (Luypaert & Huyghebaert, 2010).

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[2] Empire building hypothesis materializes when managers are more concerned to expand their business units, and the value of assets they control, than they are with developing and implementing strategies to benefit shareholders (Qiu, 2012).

As Jensen (1986) and Roll (1986) stated, both the hubris and the agency problem hypotheses, depict a positive relation between firm's internal resources and the probability of external growth through M&As. In other words, the higher firm's internal resources, such as earnings or liquidity, the higher the probability firms will engage in M&As. To proxy for firms' internal resources the paper uses the ratios EBITDA[3] to total assets and Cash to total assets. Concerning the positive relation that these two independent variables have on the probability a firm might grow inorganically through M&As, the hypothesized sign, namely the explanatory variables' coefficients, is positive. These arguments lead to the following hypothesis:

Hypothesis 1: The higher firm's internal resources the higher the probability a firm expands its business externally through mergers and/or acquisitions.

2.3. Hypothesis – Synergies

Synergies are important determinants of wealth creation in M&As, therefore they also influence the decision of a firm to expand externally (Bruner, 2004). Synergies can manifest in two main forms, operational synergies and financial synergies.

Operational synergies are reached essentially through cost savings. When a related business is added to the portfolio of a strategic buyer, equivalent processes can sometimes be eliminated or R&D costs might be shared, thus costs can be saved and therefore the operating profitability of the combined entity might increase (Luypaert & Huyghebaert, 2010). Cost savings for similar companies with high fixed costs can add up to substantial amounts, hence explain a big part of the premiums strategic buyers are willing to pay (Gaughan, 2010). Furthermore, operational synergies might derive from the benefits economies of scale and scope bring about (Besanko, Dranove, Shanley, & Schaefer, 2009). In the case of economies of scale the combined company takes advantage from sharing the fixed costs of production, which results in higher productivity as well as profitability. Additionally, through economies of scope a company might achieve cost reduction as complementary products might be cheaper to be produced together rather than in separate processes (Besanko, Dranove, Shanley, & Schaefer, 2009).

Financial synergies, on the other hand, might be realized in three different ways: matching of cash rich firms with firms that enjoy investment opportunities, increased debt capacity, and tax shield

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[3] Earnings before interest, taxes, depreciation and amortization.

exploit (Gaughan, 2010). The first motive sees a perfect combination of two companies, one with cash reserves ready to invest, and the other one with valuable projects. The combination of these two characteristics might create a combined entity where one party provides what the other lacks, thus increasing profitability. The second motive identifies the ability of a combined entity to increase its borrowing capacity, due to a higher amount of collaterals which the target company provides. As a consequence the combined entity might be able to exploit additional financing resources. The third motive suggests that the combined entity might enjoy a reduction in income taxes, therefore benefits might be derived from tax shield exploit. As income taxes is reduced, companies incur lower costs, thus higher profitability might be accomplished.

Due to availability of data, this paper examines the role of operating synergies only, focusing on the impact economies of scale might have on M&As. When two firms operate in the same business sector, they might enjoy economies of scale in R&D input, as long as the fix part of this input cost is shared (Luypaert & Huyghebaert, 2010). On the other hand, if firms do not belong to the same line of business, they might benefit from complementary know-how (Luypaert & Huyghebaert, 2010). In the process of enhancing profitability, through R&D costs sharing, intangible assets play an important role. In fact, cost savings might be achieved because the intangible assets shared, in the combined entity, prevents the acquirer from investing R&D resources to achieve a comparative advantage, which might be acquired either through mergers or acquisitions (Luypaert & Huyghebaert, 2010). As Johansson & Kang (2000) also supports, one of the main drivers in cross-border as well as domestic M&As is the need to acquire complementary intangible assets, which represent a comparative advantage, a combined entity can exploit to achieve cost savings, and profitability increase. In order to analyze the impact intangible assets have on the firm's decision to expand through M&As, the paper uses the ratio Intangibles to total assets, which measures the ratio of intangible assets minus goodwill to total assets. As Johansson & Kang (2000) suggests, the relation between Intangible to total assets and the probability a firm expands through M&As is positive.

Furthermore, the paper investigates the potential of economies of scale at industry level. The rationale used suggests that firms after M&As operate at an activity level which allows to achieve lower per unit costs, compared to the unit costs incurred prior M&As (Luypaert & Huyghebaert, 2010). To analyze costs reduction through economies of scale at industry level, the analysis carried out by Luypaert & Huyghebaert (2007) will be replicated, hence the industry Minimum Efficient Scale (MES) will be used. As Luypaert & Huyghebaert (2007) suggests, when companies use

M&As to realize cost reduction, through economies of scale, the relation between the industry MES and probability of external growth is expected to be positive. The Minimum Efficient Scale represents the smallest output a firm can achieve, while minimizing its long term average costs, hence taking advantage of economies of scale (Luypaert & Huyghebaert, 2007). To proxy for MES the paper takes the median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry[4] (Luypaert & Huyghebaert, 2007).

Nonetheless, it is worth mentioning that economies of scale are relatively more important in horizontal M&As, because horizontal integration implies firms that are involved in the same industry or stage of production, thus more likely to experience same kind of necessities as well as costs (Bruner, 2004).

The aforementioned arguments lead to the following hypotheses:

Hypothesis 2: The higher firm's INTANGIBLES/ASSETS ratio the higher the probability a firm expands its business externally through mergers and/or acquisitions.

Hypothesis 3: The higher firm's INDUSTRY MES index the higher the probability a firm expands its business externally through mergers and/or acquisitions.

2.4. Hypothesis – Market Power

M&A activities might also be influenced by industry concentration. Through horizontal integration, firms might increase their market power, and benefit from efficiency gains as well as increasing the concentration of the industry they operate in (Luypaert & Huyghebaert, 2010). On the other hand, the pitfall that arises, as a consequence of higher industry concentration, is the severe control of the US Antitrust Division, which prevents firms to achieve monopoly power, protecting consumers from the abuse of market power (Luypaert & Huyghebaert, 2010). Empirical studies such as Geiger & Schiereck (2011) already investigated on the influence of industry concentration on merger motives. The results of this study supported that merger motives in concentrated and fragmented industries are different, although bidders might benefit from M&As both taking over targets from highly and mildly concentrated industries. Furthermore, previous studies, at industry level, shed light on what are the advantages a bidder might have taking over a target from a high concentrated

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[4] SIC code stands for Standard Industrial Classification. It is composed by 4 digits, the first 2 indicate the main industry group under which the company is classified, the second 2 more closely classify the company in its major group.

industry as well as low concentrated industry. Concerning the former, when the industry is already highly concentrated the effect M&As have on market power could be lower as there is lack of room for further consolidation (Luypaert & Huyghebaert, 2010). However the bidder might be driven by production efficiency gains (Geiger & Schiereck, 2011). In the case of low concentrated industries M&As might not only accomplish production efficiency gains, but also collusion effects[5], as they might have an impact on market power (Geiger & Schiereck, 2011). Even though industry concentration per se does not influence directly the decision of a firm to expand externally through M&As, it still adds further insights on firms that engage in M&As, as previous research found advantages both in high and low concentrated industries. In order to proxy this analysis the paper embraces the structure used by Geiger & Schiereck (2011) in its investigation. Accordingly, to measure industry concentration, the paper uses the Herfindahl-Hirschman index (HHI). This index is the sum of squares of the market shares of the firms in the corresponding four-digit SIC industry[6] (Luypaert & Huyghebaert, 2010). As firms in both high and low concentrated industries might have market power and efficiency gains advantages when they engage in M&As, the paper expects a positive as well as a negative relation between the Herfindahl-Hirschman index and the probability firms expand externally through M&As.

The aforementioned arguments lead to the following hypotheses:

Hypothesis 4a: The higher INDUSTRY CONCENTRATION the higher the probability a firm expands its business externally through mergers and/or acquisitions.

Hypothesis 4b: The lower INDUSTRY CONCENTRATION the higher the probability a firm expands its business externally through mergers and/or acquisitions.

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[5] Collusion motives can be defined as attempts to break the industry's equilibrium. Firms involved in M&As, which plan to benefit from collusion motives, collaborate with each other, in order to alter prices to their advantage, gaining market power in the industry.

[6] As it follows from Geiger & Schiereck (2011), the HHI index is obtained using this formula, $\sum_{i=1}^{n} S^2$, where the variable S is the respective market share of firm I, and N the number of all companies in the four digit SIC industry of interest present in the sample. In order to compute S of firm I, the paper uses the respective firm I sales, which will be divided by the sum of the sales of all the firms in the sample that share the same four digit SIC industry. The HHI range goes from 0 to 1, with a higher value that indicates a higher degree of concentration in the industry. As the guidelines of the US Antitrust Division indicate, industries with a HHI higher that 0,18 are considered as highly concentrated (Geiger & Schiereck, 2011).

2.5. Hypothesis – Industry Shocks

Past research concerning M&A activities, focused on the relationship between industry shocks and merger waves. The paper analyzes the relation between industry growth, and M&As, particularly how high or low industry growth might affect takeover activities. Academic studies revealed that industry growth might be both negatively and positively related to takeover activities. As Powell & Yawson (2005) and Schoenberg & Reeves (1999) show, low industry growth increases the likelihood of takeover activity in the United Kingdom. This relation might be explained by the fact that firms which have a low growth rate usually are in their maturity or declining stage, hence, given the fact that the industry they belong to no longer offers opportunity to grow, firms might consider to expand, through M&As, towards alternative markets or industries, which offer better growth potential (Luypaert & Huyghebaert, 2010).

Insofar as high industry growth is concerned, Andrade and Stafford (2004) shows that sales growth and merger investments present a strong positive relation. Contrarily to the low industry growth findings, previously introduced, this study emphasizes how firms which belong to high growth industries, are more likely to be engaged in takeover activities with companies from the same industry. This relation might be explained by the fact that firms in high growth industries are willing to exploit the current industry conditions engaging in fast M&As, to achieve further growth potential (Luypaert & Huyghebaert, 2010).

In order to proxy for industry growth, the paper uses one year lagged sales growth rate, for each of every industries investigated. As it follows from the aforementioned empirical studies concerning industry growth, the proxy variable might be either positively or negatively related to the likelihood of external expansion through M&As.

The aforementioned arguments lead to the following hypotheses:

Hypothesis 5a: The higher INDUSTRY GROWTH the higher the probability a firm expands its business externally through mergers and/or acquisitions.

Hypothesis 5b: The lower INDUSTRY GROWTH the higher the probability a firm expands its business externally through mergers and/or acquisitions.

2.6. Explanatory Variables

In order to shed light on the explanatory value of bidder characteristics the paper will focus on several independent variables, which are grouped in four clusters: managerial motives and governance, realization of synergies, market power, and industry shock. The paper will then investigate on the impact that the explanatory variables might have on the decision of a firm to expand externally through M&As. The independent variables the paper will use are reported in Table 1 below.

Table 1: Explanatory Variables and Hypothesized Impact on M&A Probability

Variables	Definition	Hypothesized sign
Managerial motives and governance:		
EBITDA/ASSETS	The ratio of earnings before interest, taxes, depreciation and amortization to total assets	+
CASH/ASSETS	The ratio of cash and cash equivalents to total assets	+
Synergies:		
INTANGIBLES/ASSETS	The ratio of intangible assets minus goodwill to total assets	+
INDUSTRY MES	Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry	+
Market Power:		
INDUSTRY CONCENTRATION	Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry	+ / -
Industry shocks		
INDUSTRY GROWTH	One-year lagged sales growth rate in the corresponding four-digit SIC industry	+ / -

Source: retrieved from (Luypaert & Huyghebaert, 2010)

3. Data and Methodology

3.1. Introduction

Chapter 3 presents the methodology used to answer the research question and to analyze the relative hypotheses. The logistic regression analysis performed will be thoroughly explained, along with the reasons behind the choice of this particular type of approach. Furthermore, the data will be introduced as well as the sample selection criteria that the paper adopted to select US bidders and matching firms, which are integrative part of the analysis.

3.2. Data

As previously mentioned in Chapter 1, the paper uses data on a sample of US bidders concerning the period 2008-2011. First of all, the time lag chosen corresponds to the period that follows the 6th merger wave, which goes from 2003 to 2007. In order to investigate how drivers of bidder growth behave in firms that engage in merger and/or acquisition activities, data will be collected in two different clusters: one will include data of firms that engaged in M&As, in the aforementioned period, and the other will include data of firms that did not. Using these two clusters of data, the paper will be able to compare the main characteristics of the two data groups, thus analyze what are the possible main differences between firms that adopted an external growth strategy, through M&As, and firms that did not. Due to data availability, two databases were used to gather the information concerning the firms: Thomson One Banker was used for data which belong to firms that engaged in M&A activities, and Orbis, for data that belong to the matching companies, which did not engage in M&As. Even though these two databases are different, data are reported in the same way, thus, being comparable and applicable to the analysis. As Thomson One Banker has a data section, which is strictly related to M&A deals, data for the companies that engaged in M&As were gathered imposing only geographical restriction, as United States of America, and time restriction, which is the period 2008-2011. Concerning the type of mergers and/or acquisitions these firms were involved into, the paper included both domestic and cross-border transactions, as well as industry related and industry diversifying transactions, even though all the bidders are exclusively US firms. In addition to this, it is worth highliting that the sample selected is represeative of the country's economy, as acquirers belong to a wide range of macro-industries[7], such as consumer

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[7] Due to data availability the total number of observations is not equally splitted per macro-industry. In fact, product and services has 45 observations, consumer staples has 22 observations, energy and power has 73 observations, financials has 49 observations, health care has 68 observations, high technology has 157 observations, industrials has 84 observations, materials has 35 observations, media and entertainment has 21 observations, real estate has 6 observations, retail has 30 observations, and communications has 30 observations.

product and services, consumer staples, energy and power, financials, health care, high technology, industrials, materials, media and entertainment, real estate, retail, communications. However, every macro-industry includes multiple four-digit SIC industry codes firms belong to.

Concerning companies that engaged in M&A activities, 620 bidders were identified, which were at least involved in one M&A deal. On the other hand, regarding companies that did not engage in M&As, 620 firms, which were not involved in M&As for the 3 years period, were selected. As a result, 620 pairs of companies represent the entire data sample. Every pair has a firm that pursued M&A activities and a firm that did not. Data are structured in pairs because when the logistic regression will be performed, possible differences between the two clusters are easier to analyze. For every pair, in order to make the two firms comparable, the matching firm, which was not involved in M&As, was selected under specific criteria. In accordance with the criteria, every matching firm is equal to its corresponding bidding firm, in size, measured by firm's total assets, sales value, measured by net sales, status, which could be either public or private, and the industry they belong to, determined by the four-digit SIC industry code. In addition to this, data corresponding to the matching firms are selected from the same year that data of bidders belong to.

Furthermore, it is worth highlighting that the analysis focuses on announced M&A deals available in Thomson One Banker database, irrespective of their completion. Hence, not only completed deals, but also withdrawn deals were examined. The reason why the paper focuses on announced deals is that the study is interested in the motives underlying M&As, regardless of the outcome of the deal. In addition to this, some of the announced M&As found, were deals where the bidder companies already owned a share of the target. In order to emphasize the analysis on firms that strictly wanted to pursue external growth, as a criteria of selection, all the deals where the bidder already owned at least 50 per cent of the target company were not included in the sample .

An overview of the bidder firms selected for the analysis is provided in Table 2 below.

Table 2: Overview of Bidder Firms Selected, 2008 - 2011

	Full sample		Public bidders		Private bidders	
	N	%	N	%	N	%
Announced and Completed	573	92,43%	555	92,35%	18	90,00%
Announced and Withdrawn	47	7,57%	45	7,65%	2	10,00%
Industry related	414	66,83%	398	66,39%	16	80,00%
Industry diversifying	206	33,17%	202	33,61%	4	20,00%
Domestic	475	76,65%	465	77,37%	10	50,00%
Cross-Border	145	23,35%	135	22,63%	10	50,00%

Industry related: bidders that targeted companies from the same industry, namely the first two digits of the SIC code are identical both for the target and acquirer.
Industry diversifying: bidders that targeted companies from different industries, namely the first two digits of the SIC code of the target and acquirer do not match.
Domestic: bidders that chose US companies as their target.
Cross-Border: bidders that chose foreign companies, rather than US, as their target.

Note: the total number of bidder firms described in this table is equal to 620.

Table 2 reports a summary concerning the M&As undertaken by the 620 bidders in the sample. The results show how most of the announced deals were eventually completed, precisely 92,43 per cent, and only a minority, 7,57 per cent, were withdrawn. Concerning the target industry, the majority of the M&As in the sample are industry related[8], 66,83 per cent, Furthermore, the largest stake of transactions are addressed to US target firms, namely 76,65 per cent of M&As are domestic takeovers. It is worth mentioning that the majority of bidders in the sample selected, are Public bidders, while only 20 are Private.

3.2.1. Summary Statistic Explanatory Variables

Using the data sample, the necessary ratios to test the previously introduced hypotheses were derived. In Table 3, the summary statistic concerning the explanatory variables, which will be used during the analysis, is reported. The table precisely shows the Mean, Median and Standard Deviation of the Bidding and Matching firms. Furthermore, in order to restrain the effect of outliers on the results of the analysis, the variables have been winsorized at the mean plus or minus the

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[8] The paper defines industry related M&As the deals where both the acquirer and the target have the first two digits of the SIC code identical, that indicates that both companies belong to the same industry.

standard deviation multiplied by three. In addition to this, the p-values of the parametric T-test and non-parametric Wilcoxon rank-sum test are reported. These tests are performed to analyze whether the average values of the explanatory variables differ across bidding and matching firms. When data are normally distributed, the parametric T-test is used to detect differences in average values, however, this analysis also perform a non-parametric test since the values of the explanatory variables do not draw an exact bell-shape[9], thus they are not normally distributed. As Field (2009) suggests, when data are not normally distributed, non-parametric tests should be performed, since the results of parametric tests might not be accurate. However, for the sake of comparison Table 3 reports both parametric T-test and non-parametric Wilcoxon rank-sum test.

Table 3: Summary Statistic Bidding and Matching Firms, 2008-2011

	Bidding Firms			Matching Firms			T-Test	Wilcoxon Test
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	P-Value	P-Value
EBITDA/ASSETS	0,1057	0,1157	0,1402	-0,5411	0,0205	1,7582	**0,000**	**0,000**
CASH/ASSETS	0,1827	0,1218	0,1763	0,1833	0,0971	0,2164	0,959	**0,055**
INTANGIBLE/ASSETS	0,2648	0,2163	0,2111	0,2375	0,1695	0,2390	**0,036**	**0,003**
INDUSTRY MES	7,1995	7,0115	2,4923	3,1203	3,1824	2,5499	**0,000**	**0,000**
INDUSTRY CONCENTRATION	0,1190	0,0288	0,1736	0,1212	0,0517	0,1561	0,809	0,151
INDUSTRY GROWTH	0,1472	0,0884	0,3584	0,0762	0,0252	0,5149	**0,004**	**0,000**

Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.

Note: the explanatory variables have been winsorized at the mean plus or minus the standard deviation multiplied by three.

T-test and Wilcoxon rank sum test were used to detect whether the average values of the explanatory variables are significantly different for bidders and matching firms. Concerning the non-parametric test performed, the results in Table 3 show that the average values of all the explanatory variables, but INDUSTRY CONCENTRATION, are significantly different for bidding and matching firms, as the P values are lower than 0,1, which corresponds to the threshold used[10].

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[9] As the descriptive statistic histograms reported in Appendix A1 show, none of the explanatory variables present a clear bell-shape.
[10] Given the size of the sample, composed by 620 bidders and 620 matching firms, the significant threshold applied equals 0,1 rather than 0,05, which would have been used in case of bigger sample.

The same results are reported for the parametric test, with the exception of CASH/ASSETS, which has a value of 0,959, thus not significant.

The same summary statistic description performed to detect differences in average between bidders and matching firms, was also performed for other two pairs of subsamples, derived from the main sample, such as Industry Related and Industry Diversifying takeovers, and Domestic and Cross-Border takeovers. The subsamples were identified to analyze whether or not the average values of the explanatory variables are significantly different in the two pairs of subsamples. Tables 4 and 5 report the summary statistic description concerning the respective subsamples.

Table 4: Summary Statistic Industry Related and Industry Diversifying M&As, 2008 - 2011

	Industry Related Firms			Industry Diversifying Firms			T-Test	Wilcoxon Test
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	P-Value	P-Value
EBITDA/ASSETS	0,1107	0,1157	0,1113	0,0936	0,1166	0,1974	0,116	0,359
CASH/ASSETS	0,1812	0,1173	0,1772	0,1859	0,1281	0,1748	0,796	0,792
INTANGIBLE/ASSETS	0,2533	0,1949	0,2087	0,2881	0,2441	0,2146	**0,070**	**0,079**
INDUSTRY MES	7,2211	7,0766	2,4281	7,1548	6,9216	2,6262	0,538	0,396
INDUSTRY CONCENTRATION	0,1201	0,0328	0,1665	0,1173	0,0181	0,1899	0,900	0,336
INDUSTRY GROWTH	0,1558	0,0952	0,3418	0,1444	0,1035	0,2938	**0,000**	**0,000**

Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.

Note: the explanatory variables have been winsorized at the mean plus or minus the standard deviation multiplied by three.

As Table 4 shows, the non-parametric test indicates that only the average values of two explanatory variables, INTANGIBLE/ASSETS, and INDUSTRY GROWTH, are significantly different over the two subsamples, as the p-values are lower than the threshold of 0,1. The parametric T-test supports the same results as the Wilcoxon test.

Table 5: summary statistic Domestic and Cross-border M&As, 2008 - 2011

	Domestic Firms			Cross-border Firms			T-Test	Wilcoxon Test
	Mean	Median	Standard deviation	Mean	Median	Standard deviation	P-Value	P-Value
EBITDA/ASSETS	0,1095	0,1119	0,1077	0,0914	0,1267	0,2441	0,535	0,613
CASH/ASSETS	0,1867	0,1266	0,1799	0,1693	0,1067	0,1629	**0,048**	0,109
INTANGIBLE/ASSETS	0,2618	0,2084	0,2126	0,2750	0,2560	0,2067	**0,052**	**0,021**
INDUSTRY MES	6,9660	6,8346	2,4692	7,9630	7,9177	2,4256	**0,000**	**0,000**
INDUSTRY CONCENTRATION	0,1190	0,0323	0,1664	0,1203	0,0183	0,2004	0,898	0,308
INDUSTRY GROWTH	0,1431	0,0872	0,3290	0,1447	0,1215	0,3311	0,949	0,877

Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.

Note: the explanatory variables have been winsorized at the mean plus or minus the standard deviation multiplied by three.

As Table 5 shows, the non-parametric test indicates that only the average values of two explanatory variables, INTANGIBLE/ASSETS and INDUSTRY MES, are significantly different over the two subsamples, as the p-values are lower than the threshold of 0,1. Although the p-values reported are different for the two tests, the parametric T-test supports the same results as the Wilcoxon test, with the only exception of the explanatory variable CASH/ASSETS, which also reports significantly different means over the two subsamples.

3.3. Methodology

In order to test the seven hypotheses, introduced in Chapter 2, a logistic regression analysis will be performed, hence cross-sectional data will be methodically analysed. First of all, a dependent variable, DumMA, will be created to determine which firms in the sample are willing to expand externally through M&As, and to analyze how the independent variables might affect the external growth strategy. This dependent variable is a binomial choice variable that equals one if a firm grows through M&As and zero otherwise. The 620 bidders selected will take 1 as a value of DumMA, which indicates that these firms chose to grow externally through merger and/or acquisition. Contrarily the 620 matching firms will take value 0, as they did engage neither in merger nor acquisition. The explanatory variables that will be utilised in the logistic regression are

the ones which have been introduced in Chapter 2[11]. The independent variables will be added in the logistic regression one at the time, following the order reported in Table 1[12], to examine the model by studying how each explanatory variable added changes the impact of other independent variables on the dependent variable DumMA. This method is acknowledged as forward stepwise regression approach (Field, 2009). The reason for using a logistic regression to examine the decision of a firm to expand externally through M&As, rotates around the fact that the analysis deals with a nominal dependent variable, DumMA, with two categories. It is worth highlighting that DumMA uses the reference category 0, namely "not M&A external expansion". This is the reason because the paper is interested in analyzing how likely are firms to expand externally through mergers and/or acquisitions. Thus, by setting 0 as a reference category, the regression results that will be obtained reveal whether firms are more or less likely to grow externally through M&As, which is the strategy represented by category 1. After the logistic regression has been performed, the values of the odds ratios will be interpreted. The odds ratios measure the change in odds resulting from a unit change in the explanatory variable (Field, 2009). In this case, the odds ratio gives information concerning the likelihood a firm has to expand externally through M&A, given the change of 1 unit in the explanatory variable the odds ratio belongs to[13]. The increase by one unit in the explanatory variable is applicable to our sample, as the spread of data in every independent variable approximately resembles at least 1 unit. Using a practical example, as the odds ratio is determined by the probability an event might happen, over the probability such event might not happen, an odds ratio of value 6 of the explanatory variable EBITDA/ASSETS would indicate that the probability a firm has to expand externally through M&As, is 6 times higher than the probability the firm will not expand externally through M&As, given an increase by 1 unit in the variable EBITDA/ASSETS. Thus, in this example it is fair to claim that the higher EBITDA/ASSETS, the higher the probability a firm would expand externally.

Even though the paper focuses mainly on the odds of the explanatory variables, McFadden's R-squared[14] will also be included, as a measure of the uncertainty explained by the model. This provides an indication of how good the model under consideration truly is. Furthermore, the

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[11] See Table 1

[12] All the explanatory variables will be eventually included in the model, showing what is the impact each variable has on the regression, hence no specific criteria concerning the order variables are inserted has been adopted.

[13] A detailed explanation of how the odds ratios are computed, given the unit change in explanatory variables, is provided in Appendix A2.

[14] For logistic regression, an R-squared statistics, suitable to linear regressions, is not applicable. However, pseudo R-squareds, such as McFadden's R-squared, have been implemented to evaluate the goodness-of-fit of logistic models. A pseudo R-squared is similar to linear regression R-squared, as it uses similar scale, from 0 to 1, with higher values for better model fit. However, as Lattin, Carroll & Green (2002) suggests the values of McFadden's R-squared, are interpreted differently than linear regression R-squared. In fact, values that range from 0,3 to 0,5 are usually described as good fits (Lattin, Carroll, & Green, 2002).

elaboration model[15] will be used as a theoretical support to analyze the changes in the partial effects of the independent variables, on the dependent variable DumMA.

Model diagnostic will also be investigated to examine the assumption of multicollinearity, which has to be verified in order to obtain a reliable analysis[16]. Furthermore, a correlation analysis will be performed to shed light on the relations between the variables included in each model used.

As thoroughly explained above, the major tool the paper uses to analyze the seven hypotheses, introduced in Chapter 2, is the logistic regression. After having regressed the dependent variable DumMa, against the six independent variables, introduced in Table 1, odds ratios will be derived. Thereafter, the paper will carefully analyze the odds ratios, which will provide the necessary information to answer the seven hypotheses as well as the research question.

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[15] The elaboration model is a theoretical approach used to explain the possible partial effects an independent variable might have on other independent variables. In other words, when using logistic regression, spurious relations might arise, thus, it is important to detect and explain those spurious relations, in order to have a clear understanding of what is the real impact an independent variable has on the dependent variable.

[16] As multicollinearity is not detected, results are reported in Appendix A4.

4. Results

4.1. Introduction

Chapter 4 deals with the logistic regression results, which explain what the relation between the M&A drivers and the decision of a firm to expand externally is. First of all, a logistic regression concerning the entire sample, composed by 620 pairs of observations, will be performed, and the odds ratios will be interpreted . Ultimately, the same type of analysis will be run to examine how the M&A drivers behave in the 4 subsamples[17], analyzing possible differences with the results obtained in the full sample.

4.2. Entire Sample Analysis

Table 6: Bidders – Matching Firms, Odds Ratios

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	10,406 **(0,000)**	10,670 **(0,000)**	11,140 **(0,000)**	1,934 **(0,000)**	1,933 **(0,000)**	1,934 **(0,000)**
CASH/ASSETS		1,353 (0,346)	1,578 (0,163)	4,235 **(0,000)**	4,223 **(0,000)**	4,149 **(0,000)**
INTANGIBLE/ASSETS			2,077 **(0,009)**	3,418 **(0,000)**	3,417 **(0,000)**	3,398 **(0,000)**
INDUSTRY MES				1,844 **(0,000)**	1,844 **(0,000)**	1,839 **(0,000)**
INDUSTRY CONCENTRATION					0,957 (0,923)	0,970 (0,947)
INDUSTRY GROWTH						1,339 (0,121)
McFadden	0,111	0,111	0,115	0,362	0,362	0,363

Reference category = 0

Number of observations = 1240 (number of observations includes an equal amount of bidders and matching firms, which carry the value of 1 and 0 respectively as dependent variable DumMA).

Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.

Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.

Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.

Note1: the table shows the odds ratios of the corresponding explanatory variables. The values in brackets represent the p-values of every explanatory variable.

Note2: the p-values of the significant explanatory variables are marked in bold. The threshold of significance used equals 0,1

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[17] The 4 subsamples are: firms that acquired targets which belong to the same macro-industry (related firms), firms that acquired targets which belong to a different macro-industry (diversifying firms), firms that engaged in domestic mergers and/or acquisitions (domestic firms), firms that engaged in cross-border mergers and/or acquisitions (cross-border firms).

As Table 6 shows, in the first three Models the independent variable EBITDA/ASSETS has a relatively high odds ratios. Considering the third Model the odd ratio of 11,140 indicates that given a unit change in the independent variable of interest, for instance an increase in the ratio EBITDA/ASSETS from -0,6 to 0,4, indicates that the probability a firm grows externally through M&As is 11,140 higher than the probability a firm does not grow externally through M&As.

However, introducing the independent variable INDUSTRY MES, the odds ratio of EBITDA/ASSETS drops immediately to 1,934 in Model 4. Embracing the elaboration model approach, this drop in odds ratio indicates that the partial effect EBITDA/ASSETS has on the dependent variable is affected by INDUSTRY MES. Thus, controlling for INDUSTRY MES, the spurious effect EBITDA/ASSETS has on the dependent variable is regulated. Looking at the Table of Pearson's correlation in Appendix A3, it is possible to notice how the two variables EBITDA/ASSETS and INDUSTRY MES are positively correlated with a significance level of 0,01. This significant level of correlation explains the strong impact the variable INDUSTRY MES has on EBITDA/ASSETS, which is likely to be the origin of the spurious effect existing between the two variables.

The spurious effect INDUSTRY MES had on EBITDA/ASSETS is also present on the independent variable CASH/ASSETS. However, in this case, CASH/ASSETS and INDUSTRY MES are negatively correlated, thus an increase in odds ratio is registered in Models 4, 5 and 6 . After Model 3 the variable CASH/ASSETS assumes a relatively high value, higher than 4, and it becomes significant. Taking into account Model 6, this indicates that given an increase by one unit in the variable CASH/ASSETS, for example from -0,2 to 0,8, the probability a firm grows externally through M&As is 4,149 higher than the probability a firm does not grow externally through M&As.

Concerning the independent variable INTANGIBLE/ASSETS, a relatively high value is registered throughout the Models. Particularly after Model 4 an increase in odds ratio is reported. This indicates that the higher the value of INTANGBLE/ASSETS, the higher the probability a firm would expand externally through M&As.

Regarding the variables INDUSTRY MES and INDUSTRY GROWTH, a value higher than 1 is reported in all the Models these variables are used. Even though the values are slightly higher than 1, it is possible to infer that the higher the values of INDUSTRY MES and INDUSTRY GROWTH, the higher the probability a firm would expand externally through M&As. However, as

Table 6 shows, INDUSTRY GROWTH is not significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A.

Focusing on INDUSTRY CONCENTRATION, it is possible to see how this variable is the only one which carries a value smaller than 1 throughout the Models it is used in. This indicates that the higher the value of the independent variable, the lower the probability a firm would expand externally through M&A. However, as Table 6 shows, INDUSTRY CONCENTRATION is not significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A.

Insofar as the McFadden's R-squared is concerned, the last 3 Models have an higher value compared to the first 3 Models, which indicates that Models 4,5, and 6 have an higher explanatory power than Models 1,2 and 3, thus being more robust and thorough.

4.3. Entire Sample Interpretation

Given the aforementioned statistical results derived from SPSS, concerning the entire sample data used, the findings indicate that the higher the EBITDA/ASSETS and CASH/ASSETS, the higher is the probability a firm grows externally through M&As. This conclusion supports hypothesis 1, "*The higher firm's internal resources the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which cannot be rejected. These findings are in line with the theory of Jensen(1986) and Roll (1986), who claim that firms' internal resources and external growth strategies are positively correlated. This positive correlation might be explained by agency problems and hubris, which influence managerial choices leading to external growth strategies such as mergers and/or acquisitions. Furthermore, the statistical findings indicate that the higher INTANGIBLE/ASSETS and INDUSTRY MES, the higher the probability a firm grows externally through M&A. This conclusion supports hypothesis 2, "*The higher firm's INTANGIBLES/ASSETS ratio the higher the probability a firm expands its business externally through mergers and/or acquisitions",* and hypothesis 3, "*The higher firm's INDUSTRY MES index the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which cannot be rejected. These findings support the theory of Kang and Johansson (2000) who claim that one of the main drivers in cross-border as well as domestic M&As is the synergy derived from the complementarities of the intangible assets two combined firms might share. The intangible assets complementarities lead to cost savings and profitability enhance regarding the combined entity. Concerning the positive relation between the variable INDUSTRY MES, used as a synergy proxy,

and the decision of a firm to expand externally, the results support the findings of Luypaert & Huyghebaert (2007), which claim that companies use M&As to realize cost reduction through economies of scale. Concerning the market power hypothesis, the explanatory variable used, INDUSTRY CONCENTRATION, happens to be not significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A. However, regardless the significance of the independent variable, the results obtained would indicate that the higher the INDUSTRY CONCENTRATION, the lower the probability a firm grows externally through M&A. This would disprove hypothesis 4a, *"The higher INDUSTRY CONCENTRATION the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which would be rejected, but would support hypothesis 4b, *"The lower INDUSTRY CONCENTRATION the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which would not be rejected. The reason why hypothesis 4a would be rejected and 4b would not, might be explained by Geiger & Schiereck (2011), which claims that the higher the industry concentration the lower is the room for further consolidation as well as the opportunity of further efficiency gains, a firm might have merging or acquiring another firm in the industry of interest. Ultimately, focusing on the last independent variable, even though the results indicate that the higher the INDUSTRY GROWTH, the higher the probability a firm grows externally through M&As, the explanatory variable happens to be not significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A. Regardless the significance of the independent variable, the results obtained would support hypothesis 5a, *"The higher INDUSTRY GROWTH the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which would not be rejected, but would disprove hypothesis 5b, *"The lower INDUSTRY GROWTH the higher the probability a firm expands its business externally through mergers and/or acquisitions",* which would have to be rejected. The findings would be in line with the conclusion driven by Andrade & Stafford (2004) that claim that sales growth and merger investments are positively correlated. The positive relation between INDUSTRY GROWTH and the probability a firm grows externally through M&As would be explained by the fact that firms in high growth industries are willing to exploit the current industry conditions engaging in fast M&As in order to achieve further growth potentials.

4.4. Subsamples Analysis and Interpretation

In this section a logistic regression is performed for each one of the four subsamples, in order to detect how results derived from subsample data might differ from the entire sample analysis performed in Table 6.

4.4.1. Related Firms

Table 7: Related Firms, Odds Ratios

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	57,579 **(0,000)**	58,997 **(0,000)**	67,542 **(0,000)**	3,172 **(0,028)**	3,171 **(0,028)**	2,922 **(0,034)**
CASH/ASSETS		1,241 (0,603)	1,548 (0,301)	4,770 **(0,001)**	4,770 **(0,001)**	4,899 **(0,001)**
INTANGIBLE/ASSETS			3,491 **(0,001)**	4,128 **(0,001)**	4,128 **(0,001)**	4,392 **(0,001)**
INDUSTRY MES				1,867 **(0,000)**	1,867 **(0,000)**	1,874 **(0,000)**
INDUSTRY CONCENTRATION					1,004 (0,994)	1,017 (0,977)
INDUSTRY GROWTH						1,811 **(0,011)**
McFadden	0,165	0,166	0,176	0,385	0,385	0,390

Reference category = 0

Number of observations = 830 (number of observations includes an equal amount of bidders and matching firms, which carry the value of 1 and 0 respectively as dependent variable DumMA).
Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.
Note1: the table shows the odds ratios of the corresponding explanatory variables. The values in brackets represent the p-values of every explanatory variable.
Note2: the p-values of the significant explanatory variables are marked in bold. The threshold of significance used equals 0,1.

Table 7 above reports the regression results only for the firms who acquired targets which belong to the same macro-industry. Except for the independent variable INDUSTRY CONCENTRATION, which has a value higher than 1, these results lead to the same relations between the dependent and the independent variables as the ones reported in the entire sample analysis in Table 6, although the magnitude is different. Insofar as the variable INDUSTRY CONCENTRATION is concerned, the

odds ratios 1,004 and 1,017 in Models 5 and 6, are higher than 1, which suggest that the higher the INDUSTRY CONCENTRATION, the higher the probability a firm would grow externally through M&A. However, as long as INDUSTRY CONCENTRATION happens to be not significant, it cannot be considered as a major driver of firms' decision to grow through M&A. In addition to this, the aforementioned relation between the independent variable and the probability a firm would expand externally is relatively weak, as the odds ratios are just few decimals above 1. Taking into account Model 6, an increase in the variable INDUSTRY CONCENTRATION, for example from 0 to 1, shows that the probability a firm would grow externally through M&As is just 1,017 higher than the probability a firm would not grow externally through M&As. Hence, regardless the significance of the explanatory variable, it could be said that firms that belong to the same industry are not really likely to expand externally through M&A, in case the industry concentration increases. This may be the case because when an industry increases its concentration, firms that belong to such industry might perceive a lower effect M&As might have on market power, as there is lack of room for further consolidation, particularly when the market they belong to might be already dominated by few big firms, which do not favor a competitive playground for smaller firms, offering poor chances of growth.

Concerning the other independent variables, CASH/ASSETS, INDUSTRY MES and INDUSTRY GROWTH show roughly the same values as the results for the entire sample reported in Table 6, thus no difference is reported in terms of interpretation. However, insofar as INDUSTRY GROWTH is concerned, the p-value becomes significant in Table 7. Thus, it is possible to conclude that for the related firms subsample, the higher the growth of the industry the higher the probability firms involved in the respective industry have, to expand their business externally through mergers and/or acquisitions. This change in significance, concerning INDUSTRY GROWTH, could be attributed to a change in the mean and/or standard deviation of the subsample related data.

Furthermore, in the first three Models the variable EBITDA/ASSETS shows a relatively higher probability of a firm growing externally through M&As, given a unit change in the ratio EBITDA/ASSETS, although in the last three Models, when INDUSTRY MES is included as a control variable, the change in magnitude effect, regarding odds ratios, becomes closer to what was observed in the entire sample in Table 6. These results might indicate that for companies that operate in the same industry a relatively high internal resources increase the likelihood a firm would expand externally. This can be explained by the higher level of similarities among firms and lack of entry barriers, a domestic related market can offer, being relatively easier for a company to expand

externally. Another difference in terms of magnitude is represented by the variable INTANGIBLE/ASSETS which has slightly higher odds ratios in the 4 Models it is applied, compared to what was observed in the entire sample in Table 6. This may be the reason because as both the acquirer and the target belong to the same industry, it might be easier to exploit synergies derived from this type of assets, given the fact that both firms might benefit from the same regulatory system and similarity among the kind of intangible assets they possess.

4.4.2. Diversifying Firms

Table 8: Diversifying Firms, Odds Ratios

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	2,692 **(0,000)**	2,744 **(0,000)**	2,746 **(0,000)**	1,339 (0,248)	1,340 (0,251)	1,378 (0,193)
CASH/ASSETS		1,900 (0,226)	1,918 (0,231)	12,167 **(0,000)**	12,419 **(0,000)**	12,019 **(0,000)**
INTANGIBLE/ASSETS			1,036 (0,939)	2,245 (0,170)	2,265 (0,166)	2,238 (0,173)
INDUSTRY MES				1,774 **(0,000)**	1,776 **(0,000)**	1,775 **(0,000)**
INDUSTRY CONCENTRATION					1,247 **(0,000)**	1,224 (0,781)
INDUSTRY GROWTH						1,377 (0,365)
McFadden	0,050	0,053	0,053	0,330	0,330	0,332

Reference category = 0

Number of observations = 410 (number of observations includes an equal amount of bidders and matching firms, which carry the value of 1 and 0 respectively as dependent variable DumMA).
Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.
Note1: the table shows the odds ratios of the corresponding explanatory variables. The values in brackets represent the p-values of every explanatory variable.
Note2: the p-values of the significant explanatory variables are marked in bold. The threshold of significance used equals 0,1.

Table 8 above reports the regression results only for the firms that acquired targets which belong to a different macro-industry. These results lead to the same relations between the dependent and the independent variables as the ones reported in the entire sample analysis in Table 6, except for the

variable INDUSTRY CONCENTRATION, which has odds ratios higher than 1, in Model 5 and 6. In this subsample, the explanatory variable INDUSTRY CONCENTRATION happens to be not significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A. However, the related findings to the explanatory variable would suggest that the higher the INDUSTRY CONCENTRATION, the higher the probability a firm would grow externally through M&A. According to these findings, regardless the significance of the independent variable, it is possible to infer that firms that expand externally, towards different macro-industries, belong to industries which are relatively high concentrated. This may be the case of firms which expand to other fields or sectors of production, differentiating their growth strategy, since the market they belong to might be already dominated by few big firms, which do not favor a competitive playground for smaller firms, offering poor chances of growth.

In terms of magnitude different results belong to the variables CASH/ASSETS and INTANGIBLE/ASSETS. The former has a relatively high odds ratios particularly in the last three Models, while the latter has relatively low odds ratios compared to the entire sample results in Table 6. These results might indicate that acquirers that target different macro-industries posses relatively large cash reserves, since cash payment, in transactions among different industries, might be preferred. This may be the reason because through cash payment, it is less likely that agency problems might arise, given the transparency of the payment method. Furthermore, differently from the previously analyzed subsample, the intangible assets of the acquirer has a smaller impact on the probability of a firm to expand externally through M&As. This might be the reason because, given the fact that the acquirer and the target do not belong to the same industry, the synergies derived from this type of assets might have relatively small importance on the takeover decision, differently than what has been observed in the related firms subsample. However, as long as the explanatory variable INTANGIBLE ASSETS happens to be not significant, it cannot be considered as a major driver of firms' decision to grow through M&A.

Concerning the other explanatory variables, EBITDA/ASSETS, INDUSTRY MES and INDUSTRY GROWTH, show roughly the same values as the results for the entire sample presented in Table 6, thus no difference is reported in terms of interpretation. However, the explanatory variables EBITDA/ASSETS and INDUSTRY GROWTH, happen to be not significant in the last three Models, thus they cannot be considered as major drivers of firms' decision to grow through M&A. The change in significance, compared to the entire sample, concerning EBITDA/ASSETS, could be attributed to a change in the mean and/or standard deviation of the

subsample related data. In addition to this, it is worth highlighting that the partial effect that EBITDA/ASSETS has on the dependent variable is affected by INDUSTRY MES. In fact, controlling for INDUSTRY MES, the independent variable EBITDA/ASSETS becomes not significant in Models 4,5 and 6, as Table 8 shows.

4.4.3. Differences between Subsamples: Related Firms versus Diversifying Firms

The regression results for firms that acquired or merged with targets which belong to the same macro-industry, and firms that acquired or merged with targets which belong to a different macro-industry are reported in Tables 7 and 8 respectively. In terms of significance of the explanatory variables, Table 7 shows that for related firms all the variables but INDUSTRY CONCENTRATION are significant. This suggests that INDUSTRY CONCENTRATION cannot be considered as a major driver of firms' decision to grow through M&A for firms that acquired or merged with targets which belong to the same macro-industry. On the other hand, Table 8 shows that for diversifying firms the only two explanatory variables which are significant are CASH/ASSETS and INDUSTRY MES, while the other explanatory variables cannot be considered as major drivers of firms' decision to grow through M&A. In terms of magnitude the main differences between the two subsamples are represented by the explanatory variables CASH/ASSETS, INTANGIBLE/ASSETS and EBITDA/ASSETS. Concerning CASH ASSETS, the odds ratios are higher for diversifying firms, particularly in the last three Models, than for related firms, as it can be deducted from Tables 7 and 8. These results might indicate that acquirers that target different macro-industries are likely to have relatively large cash reserves, since cash payment, in transactions among different industries, might be preferred, compared to transactions in the same industry, where also other payment methods are likely to be used. This may be the reason because through cash payment, it is less likely that agency problems might arise, given the transparency of the payment method. Regarding INTANGIBLE/ASSETS, the odds ratios are higher for related firms than for diversifying firms, as Tables 7 and 8 show. This may be the reason, because the fact to belong to the same industry might benefit both the acquirer and target in terms of intangible assets. The advantage two firms of the same industry might have, is determined by the similarity among the intangible assets they possess. On the other hand, when firms do not belong to the same industry, they might have different and not compatible intangible assets, which might be the reason why the odds ratios for diversifying firms, regarding the explanatory variable INTANGIBLE/ASSETS, happen to be lower than for related firms. Concerning EBITDA/ASSETS,

the odds ratios are higher for related firms than for diversifying firms, as Tables 7 and 8 show. This may be the reason because the similarities and common features that firms in the related firms subsample benefit of, as well as the lack of entry barriers a related industry can offer, make it easier for a company to expand externally in the industry it operates, in case of higher internal resources availability.

4.4.4. Domestic Firms

Table 9: Domestic Firms, Odds Ratios

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	56,080 (0,000)	57,899 (0,000)	66,341 (0,000)	4,471 (0,003)	4,492 (0,003)	7,596 (0,001)
CASH/ASSETS		1,507 (0,291)	1,983 (0,084)	5,197 (0,000)	5,174 (0,000)	5,815 (0,000)
INTANGIBLE/ASSETS			3,576 (0,000)	5,306 (0,000)	5,308 (0,000)	6,063 (0,000)
INDUSTRY MES				1,749 (0,000)	1,749 (0,000)	1,758 (0,000)
INDUSTRY CONCENTRATION					0,824 (0,715)	0,879 (0,811)
INDUSTRY GROWTH						2,685 (0,000)
McFadden	0,165	0,166	0,177	0,358	0,358	0,372

Reference category = 0

Number of observations = 950 (number of observations includes an equal amount of bidders and matching firms, which carry the value of 1 and 0 respectively as dependent variable DumMA).
Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.
Note1: the table shows the odds ratios of the corresponding explanatory variables. The values in brackets represent the p-values of every explanatory variable.
Note2: the p-values of the significant explanatory variables are marked in bold. The threshold of significance used equals 0,1.

Table 9 above shows the regression results only for the firms that engaged in domestic mergers and/or acquisitions, thus targeting only US firms. The odds ratios reported, roughly reflect the same relations as the ones observed in the entire sample in Table 6. The main difference with the entire sample are mostly of magnitude kind. In the first three Models the variable EBITDA/ASSETS shows a relatively high probability of a firm growing externally through M&As, given a unit change in the ratio EBITDA/ASSETS. However, in the last three Models, when INDUSTRY MES is

included as a control variable, the odds ratios significantly decrease in magnitude, although still keeping higher values than the ones observed in the entire sample in Table 6. Furthermore, the variables INTANGIBLE/ASSETS, and INDUSTRY GROWTH, which becomes also significant, have relatively higher odds ratios compared to the findings in the entire sample in Table 6.

Comparing the results obtained in the entire sample in Table 6, with the ones derived from this subsample analysis, it is possible to conclude that firms which engage in domestic mergers and/or acquisitions have a relatively high probability to expand externally through M&As the higher the ratios EBITDA/ASSETS, INTANGIBLE/ASSETS and INDUSTRY GROWTH. Regarding the ratio EBITDA/ASSETS this may be the reason because companies that operate in the same domestic market might have higher level of similarities among themselves as well as lack of entry barriers, which the domestic common market can offer, thus being relatively easy for a company to expand externally. Regarding the ratio INTANGIBLE/ASSETS the odds ratios observed in this subsample may be explained as both the acquirer and the target in a transaction, are US firms, hence it is easier to exploit synergies derived from this type of assets, given the fact that both firms are regulated by the same authorities. Moreover, the fact that both companies belong to the same national market, means that international barriers are inexistent and do not represent a threat in case of merger or acquisition. Insofar as the INDUSTRY GROWTH is concerned, the observed results in this subsample suggest that in the same domestic market companies are more willing to grow externally as the industry they belong to is growing at a relatively high pace. This might be explained by the fact that firms in high growth industries are willing to exploit the current industry conditions engaging in fast M&As, in order to achieve further growth potential, especially among companies from the same domestic market, where entry barriers are almost absent.

Concerning the other explanatory variables CASH/ASSETS, INDUSTRY MES and INDUSTRY CONCENTRATION the odds ratios are roughly the same as the ones reported in Table 6 for the entire sample, as well as their significance, which do not change, thus no difference is reported in terms of interpretation.

4.4.5. Cross-Border Firms

Table 10: Cross-Border Firms, Odds Ratios

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	1,953 **(0,014)**	1,954 **(0,014)**	1,951 **(0,015)**	0,558 (0,201)	0,549 (0,186)	0,579 (0,233)
CASH/ASSETS		1,009 (0,988)	0,947 (0,931)	33,515 **(0,000)**	35,034 **(0,000)**	33,153 **(0,000)**
INTANGIBLE/ASSETS			0,674 (0,458)	0,665 (0,608)	0,660 (0,601)	0,650 (0,588)
INDUSTRY MES				2,379 **(0,000)**	2,395 **(0,000)**	2,386 **(0,000)**
INDUSTRY CONCENTRATION					1,810 (0,535)	1,938 (0,492)
INDUSTRY GROWTH						1,527 (0,420)
McFadden	0,023	0,023	0,024	0,450	0,451	0,453

Reference category = 0

Number of observations = 290 (number of observations includes an equal amount of bidders and matching firms, which carry the value of 1 and 0 respectively as dependent variable DumMA).
Industry MES: Median of the natural logarithm of total assets of firms in the corresponding four-digit SIC industry.
Industry Concentration: Herfindahl-Hirschman index, that is the sum of squares of the market shares of all firms in the corresponding four-digit SIC industry.
Industry Growth: One-year lagged sales growth rate in the corresponding four-digit SIC industry.
Note1: the table shows the odds ratios of the corresponding explanatory variables. The values in brackets represent the p-values of every explanatory variable.
Note2: the p-values of the significant explanatory variables are marked in bold. The threshold of significance used equals 0,1.

Table 10 above shows the regression results only for the firms that engaged in cross-border mergers and/or acquisitions. Comparing this findings to the results obtained in the entire sample regression in Table 6, it is possible to notice several major differences. First of all, once the control variable INDUSTRY MES has been introduced in the Model, there is a negative relation between the probability a firm has to expand externally through M&As and the independent variable EBITDA/ASSETS, as the odds ratios, with a value lower than 1, in Models 4,5 and 6 show. In addition to this, introducing in the Model INDUSTRY MES, EBITDA/ASSETS is no longer significant, thus it cannot be considered as a major driver of firms' decision to grow through M&A. However, regardless the significance of the independent variable, it is possible to infer that concerning firms which engage in cross-border takeovers, the higher the EBITDA/ASSETS, the lower the probability a firm would engage in M&A. This may be the case because even though firms might experience an increase in earnings results, they would not be willing to expand

externally selecting targets in a foreign market, given the international barriers they would have to overcome, which would also imply higher risks to burden. Concerning the independent variable CASH/ASSETS, the magnitude of the odds ratio, which is relatively high in the last 3 Models, compared to the entire sample analysis in Table 6, suggests that acquirers, which engage in cross-border M&As, might use cash as a prevalent form of payment. Thus the higher their cash reserves, the higher the probability they engage in cross-border M&As. This might be the reason because cash payments guarantees a relatively high transparency, which is preferred especially in overseas transactions due to the risk involved in cross-border obstacles[18].

Another aspect that differs in this subsample, from the findings in the entire sample in Table 6, is the odds ratios of INTANGIBLE/ASSETS, which are smaller than 1, in the last four Models. This might indicate that the higher the INTANGIBLE/ASSETS, the lower the probability a firm grows externally through M&As. This might be explained by the fact that intangible assets do not play a striking role in the decision of a firm to expand externally through M&As, in cross-border takeovers, because as target firms do not belong to the US market, the amount of synergies realizable from intangible assets might be limited, given the aforementioned cross-border obstacles that the two companies need to take into account. However, as long as INTANGIBLE/ASSETS is not significant, it cannot be considered as a major driver of firms' decision to grow through M&A.

Another difference with the entire sample results in Table 6, is the relation between the decision to expand externally through M&As and the variable INDUSTRY CONCENTRATION. The results in this subsample show that the higher the INDUSTRY CONCENTARTION, the higher the probability a firm grows externally through M&As. On the other hand, the results derived from the entire sample show the opposite relation. The positive relation found in this subsample might be explained by the fact that bidders in a relatively high concentrated industry might use the external cross-border takeover strategy to achieve production efficiency gains abroad, as domestic market growth opportunities might be prevented by the presence of few major players, which are ruling the market. However, as long as INDUSTRY CONCENTRATION is not significant, it cannot be considered as a major driver of firms' decision to grow through M&A.

Concerning the other explanatory variables INDUSTRY MES and INDUSTRY GROWTH, the odds ratios are roughly the same as the ones reported in Table 6 for the entire sample, as well as their significance, which do not change, thus no difference is reported in terms of interpretation.

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[18] In cross-border M&As there are numerous obstacles that firms have to consider in the takeover act. Such obstacles might be: the difference in national regulatory systems, different national authorities, different currencies, cross-border transaction costs, differences in taxes, differences in accounting systems (Bruner, 2004).

4.4.6. Differences between Subsamples: Domestic Firms versus Cross-Border Firms

The regression results for firms that engaged in domestic mergers and/or acquisitions, targeting only US firms, and firms that engaged in cross-border mergers and/or acquisitions are reported in Tables 9 and 10 respectively. In terms of significance of the explanatory variables, Table 9 shows that for domestic firms all the variables but INDUSTRY CONCENTRATION are significant. This suggests that INDUSTRY CONCENTRATION cannot be considered as a major driver of firms' decision to grow through M&A, for firms that engaged in domestic takeovers. On the other hand, Table 10 shows that for cross-border firms the only two explanatory variables which are significant are CASH/ASSETS and INDUSTRY MES, while the other explanatory variables cannot be considered as major drivers of firms' decision to grow through M&A. In terms of magnitude the main differences between the two subsamples are represented by the explanatory variables EBITDA/ASSETS, CASH/ASSETS, INTANGIBLE/ASSETS and INDUSTRY CONCENTRATION. Concerning EBITDA/ASSETS, Table 10 shows that the odds ratios for cross-border firms are lower than 1 in the last three Models, differently than domestic firms, which have odds ratios higher than 1, as Table 9 shows. These results might indicate that firms that experience an increase in earnings results, would not be willing to expand externally selecting targets in a foreign market, but they would rather engage in a domestic takeover. This might be explained by the international barriers firms would have to overcome, in case they choose to undertake a cross-border transaction, which would also imply higher risks to burden. Concerning CASH/ASSETS, odds ratios are relatively higher, particularly in the last three Models, for cross-border firms than domestic firms, as Tables 9 and 10 show. These results might be explained by the fact that firms which engage in cross-border M&As, might use cash as a prevalent form of payment. This may be the reason because cash payment guarantees a relatively high transparency, which is preferred due to the risks involved in cross-border transactions. On the other hand, firms that engage in domestic transactions, are likely to use also other payment methods rather than cash, given the lower amount of risk and fewer obstacles firms might encounter in the domestic market. Regarding INTANGIBLE/ASSETS, Table 10 shows that the odds ratios for cross-border firms are lower than 1 in the last four Models, differently than domestic firms, which have odds ratios higher than 1, as Table 9 shows. This can be explained by the fact that intangible assets do not play a striking role in the decision of a firm to expand externally through M&As, in cross-border transactions, because as target firms belong to different foreign markets with different regulatory systems, the amount of synergies realizable from intangible assets might be limited. On the other hand, for firms that belong to the same domestic market, may be easier to exploit synergies

derived from intangible assets, given the fact that both firms are regulated by the same authorities. Concerning INDUSTRY CONCENTRATION, Table 10 shows that the odds ratios for cross-border firms are higher than 1 in the last two Models, differently than domestic firms, which have odds ratios lower than 1, as Table 9 shows. These results might be explained by the fact that bidders in a relatively high concentrated industry might use the external cross-border takeover strategy to achieve production efficiency gains abroad, as domestic market growth opportunities might be prevented by the presence of few major players, which are ruling the market.

5. Summary and Conclusion

This paper investigated what are the bidder characteristics, industry and market values that trigger US-based companies' decision to engage in M&A activities in the period 2008-2011. To analyze and explain what is the role M&A drivers play, and why firms decide to expand inorganically through M&As, theories developed by scholars have been used, from which a theoretical framework has been constructed. Accordingly, seven hypotheses have been formulated to explain what influences firms' decision to engage in M&A activity. The possible reasons the study takes into account to explain external growth through M&As are managerial motives and governance, synergies, market power and industry shocks. Concerning managerial motives and governance, the paper investigates what role internal resources, such as earnings and cash, might play in the decision of a firm to expand externally through M&As. Regarding synergies the paper investigates on the role intangible assets and economies of scale might play in the decision of a firm to expand externally through M&As. Concerning industry shocks and market power, the paper investigates on the role industry concentration and industry growth might play in the decision of a firm to expand externally through M&As. The data sample used includes 620 US bidders, which in the period 2008-2011 were involved in mergers and/or acquisitions. The all sample was also split in four subsamples, represented by firms which were involved in either cross-border or domestic M&As, and firms which targeted companies either from the same or different industry. Furthermore, following the approach of Luypaert & Huyghebaert (2010) the seven hypotheses have been analyzed using a logistic regression model. The development of the seven hypotheses leads to the formulation of an answer to the research question: *What drivers explain whether firms decide to grow externally versus internally, and what is the explanation behind the revealed relation in the US market?* An increase in firm's internal resources increases the probability of external growth through mergers and/or acquisitions, as the higher availability of resources might increase the room for firm's investments as well as be an incentive for agency problems such as managerialism and empire building. Furthermore, an increase in intangible assets, which represent a comparative advantage, a combined entity can exploit to achieve cost savings, and enhance profitability, increases the probability a firm expands its business externally through mergers and/or acquisitions. In addition to this, synergies derived from the availability of intangible assets induce to costs reduction as R&D investments might be reduced. In terms of other synergies realizable, the higher the costs reduction a firm can achieve through economies of scale, the higher the probability a firm expands its business externally through mergers and/or acquisitions. At industry level, the lower the

concentration of the industry a firm belongs to, the higher is the probability that firm would expand its business externally through mergers and/or acquisitions. This might be the case because relatively low concentrated industry offer large room for further consolidation as well as efficiency gains firms might achieve merging or acquiring another entity. Furthermore, the higher is the growth of the industry a firm operates in, the higher is the probability that firm expands its business externally through mergers and/or acquisitions. This relation might be explained by the fact that firms which operate in relatively high growth industries are willing to exploit the current industry conditions engaging in fast M&As, in order to achieve further growth potential. However, as the proxies for the concentration and growth of the industry a firm belongs to, happened to be not significant in the model developed, the market power and industry shocks hypotheses cannot be considered as major drivers of firms' decision to grow through M&As.

In terms of results, differences were detected between subsamples. It is worth highlighting how firms that target different macro-industries, or are involved in cross-border transactions, are likely to have relatively large cash reserves. This might be the reason because cash payment, in transactions among different industries or countries might be preferred, given the relatively high level of transparency it guarantees. Furthermore, the importance of intangible assets is particularly evident for firms that belong to the same industry or undertake domestic transactions, given the benefits derived from the similarity of the intangible assets they possess. This is not the case of firms that do not belong to the same industry or are involved in cross-border transactions, which might have different and not compatible intangible assets. Moreover, firms that experience an increase in earnings results, would not be willing to expand externally selecting targets in a foreign market, given the risks involved in cross-border obstacles, but they would rather engage in a domestic transaction. In addition to this, firms that belong to a relatively high concentrated industry might use the external cross-border takeover strategy to achieve production efficiency gains abroad, as domestic market growth opportunities might be prevented by the presence of few major players, which are ruling the market.

Concerning this type of study, future research may shed light on the effect other drivers might have on the decision of firms to grow externally through mergers and/or acquisitions. Furthermore, the same kind of analysis might be expanded to other countries, rather than the US, to compare how drivers might differ in the decision of firms to expand their business externally. In addition to this, the results provided by the paper are derived from a restricted time period. Expanding the time period and improving the number of observations of the sample will significantly amplify the

validity and quality of the results. However, the study performed presents a neat framework and a structured analysis, which might open doors for future research.

6. Bibliography

Andrade, G., & Stafford, E. (2004). Investigating the economic role of mergers. *Journal of Corporate Finance 10*, 1-36.

Arzac, E. (2007). *Valuation for Acquisitions, Buyouts and Restructuring* (Second Edition ed.). Wiley & Sons, Inc.

Besanko, D., Dranove, D., Shanley, M., & Schaefer, S. (2009). *Economics of Strategy* (fifth ed.). Wiley & Sons, Inc.

Bruner, R. (2004). *Applied Mergers and Acquisitions.* New Jersey: Wiley & Sons, Inc.

Devos, E., Kadapakkam, P., & Krishnamurthy, S. (2009). How do mergers create value? A comparison of taxes, market power, and efficiency improvements as explanations for synergies. *Rev Financ Stud*, p. 1179–1211.

Dietrich, J., & Sorensen, E. (1984). An application of logit analysis to prediction of merger targets. *J Bus Res*, p. 393–402.

Field, A. (2009). *Discovering Statistics Using SPSS* (Third Edition ed.). London: Sage Publications.

Finnegan, J. (2011). *americancenturyblog.com*. Retrieved by http://americancenturyblog.com/2011/05/global-mergers-and-acquisitions-activity-continues-to-rise/

Gaughan, P. A. (2010). *Mergers, acquisitions and corporate restructurings* (5th Edition ed.). New Jersey: Wiley & Sons, Inc.

Geiger, F., & Schiereck, D. (2011). The influence of industry concentration on merger motives—empirical evidence from machinery industry mergers. *Journal of Economics and Finance* .

Jensen, M. C. (1986). Agency Cost Of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review , 76*(2), 323-329.

Johansson, S., & Kang, H. N. (2000). Cross-Border Mergers and Acquisitions. Their Role in Industrial Globalisation. *OECD Science, Technology and Industry Working Papers, 2000/01*. OECD Publishing.

Lattin, J., Carroll, D., & Green, P. (2002). *Analyzing Multivariate Data (Duxbury Applied Series).* Duxbury Press.

Luypaert, M., & Huyghebaert, N. (2007). *Determinants of Growth through Mergers and Acquisitions: An Empirical Analysis*. European University College Brussels (EHSAL).

Luypaert, M., & Huyghebaert, N. (2010). Antecedents of growth through mergers and acquisitions: Empirical results. *Journal of Business Research*, 392–403.

Powell, R., & Yawson, A. (2005). Industry aspects of takeovers and divestitures: Evidence from the UK. *Journal of Banking & Finance 29*, 3015-3040.

Qiu, B. (2012). *Mergers and Acquisitions.* Retrieved by http://bblp.eur.nl/: http://bblp.eur.nl/webapps/portal/frameset.jsp?tab_tab_group_id=_2_1&url=%2Fwebapps%2Fblackboard%2Fexecute%2Flauncher%3Ftype%3DCourse%26id%3D_5895_1%26url%3D
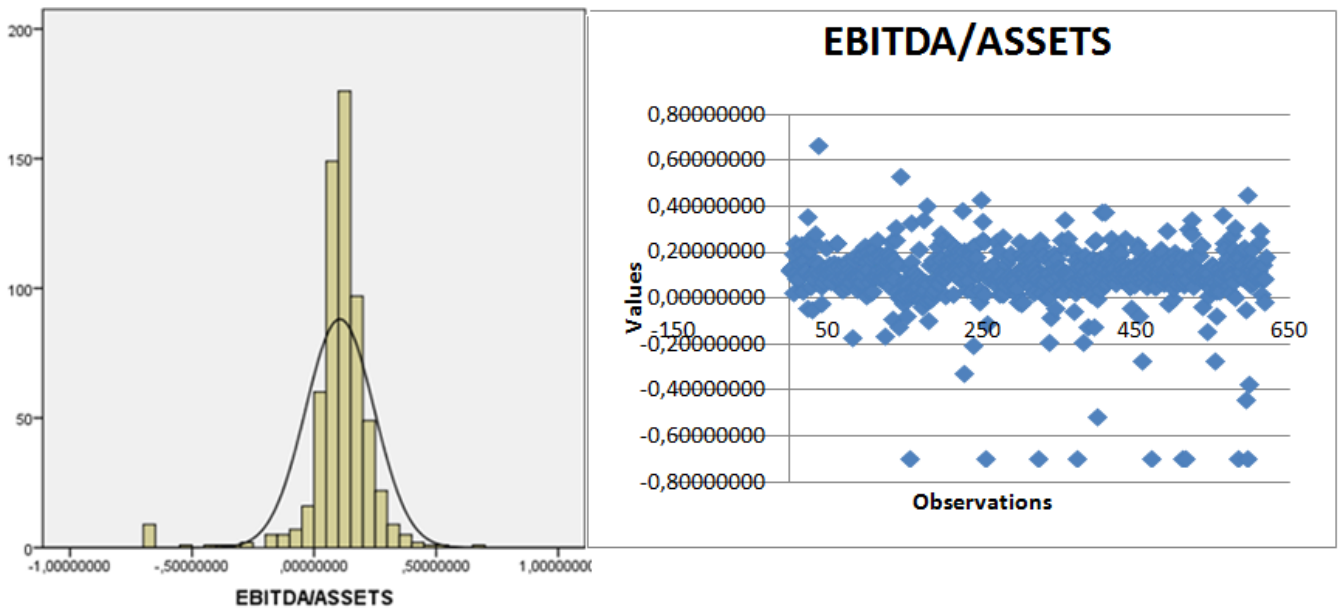
Roll, R. (1986). The hubris hypothesis of corporate takeovers . *Journal of Business 59*, 197-216.

Schoenberg, R., & Reeves, R. (1999). What determines acquisition activity within an industry? *European Management Journal 17*, 93–98.
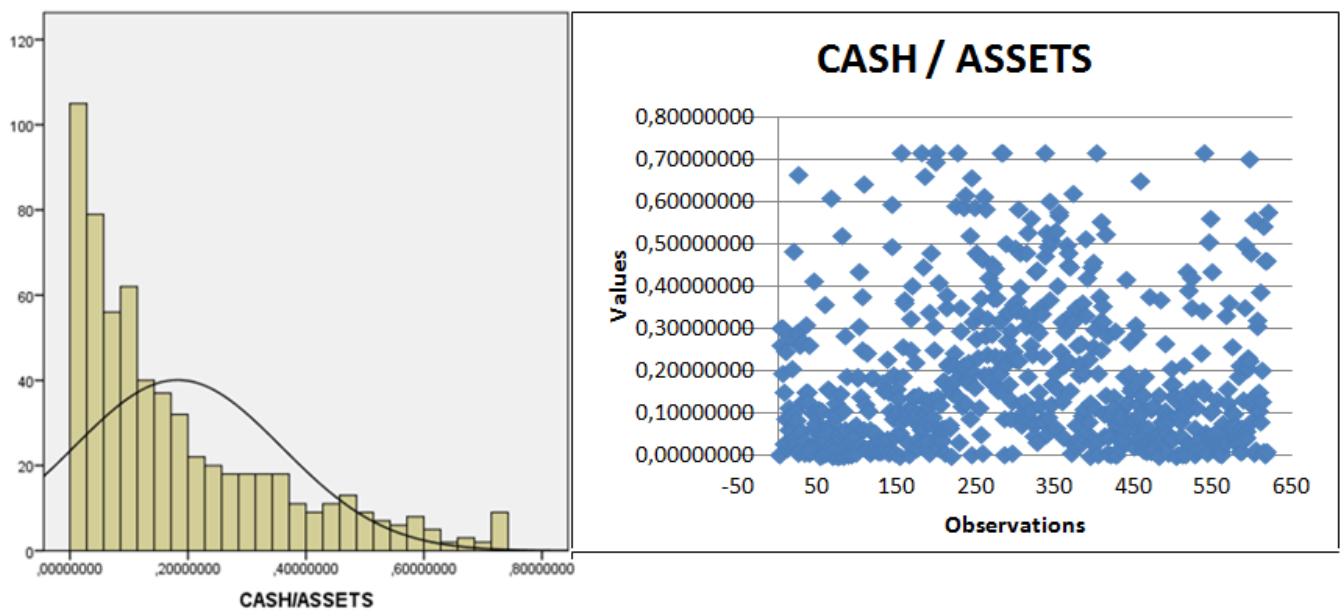
7. Appendix

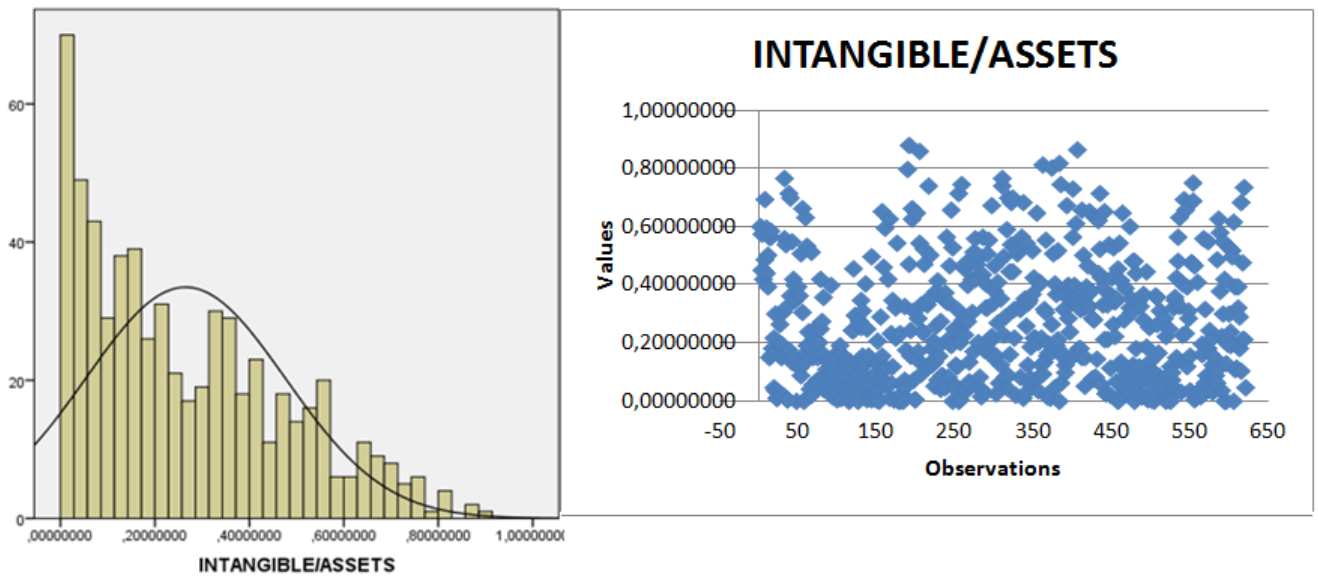## 7.1. Appendix A1 – Descriptive Statistic of the Independent Variables

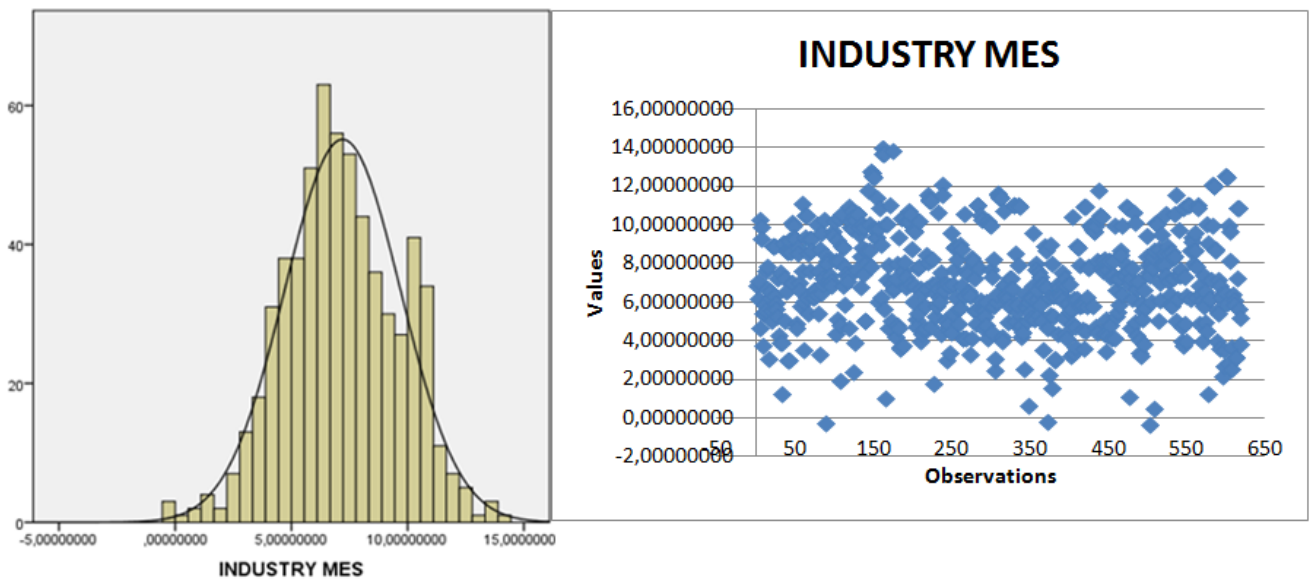Graph A1: EBITDA/ASSETS Distribution
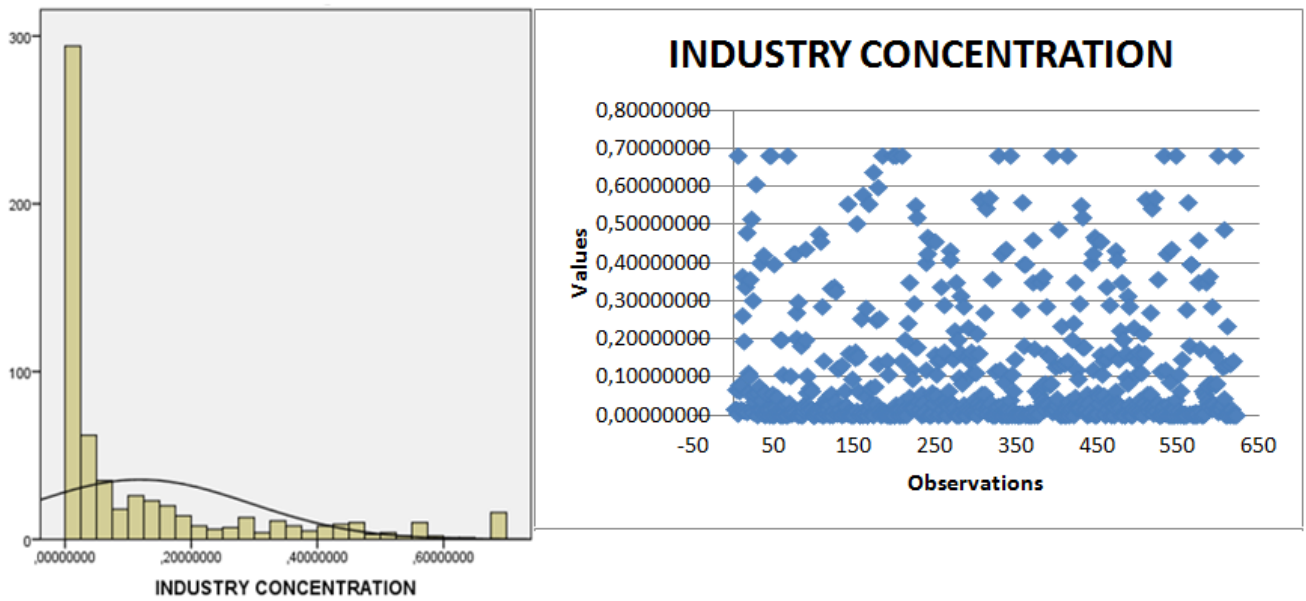

Graph A2: CASH/ASSETS Distribution

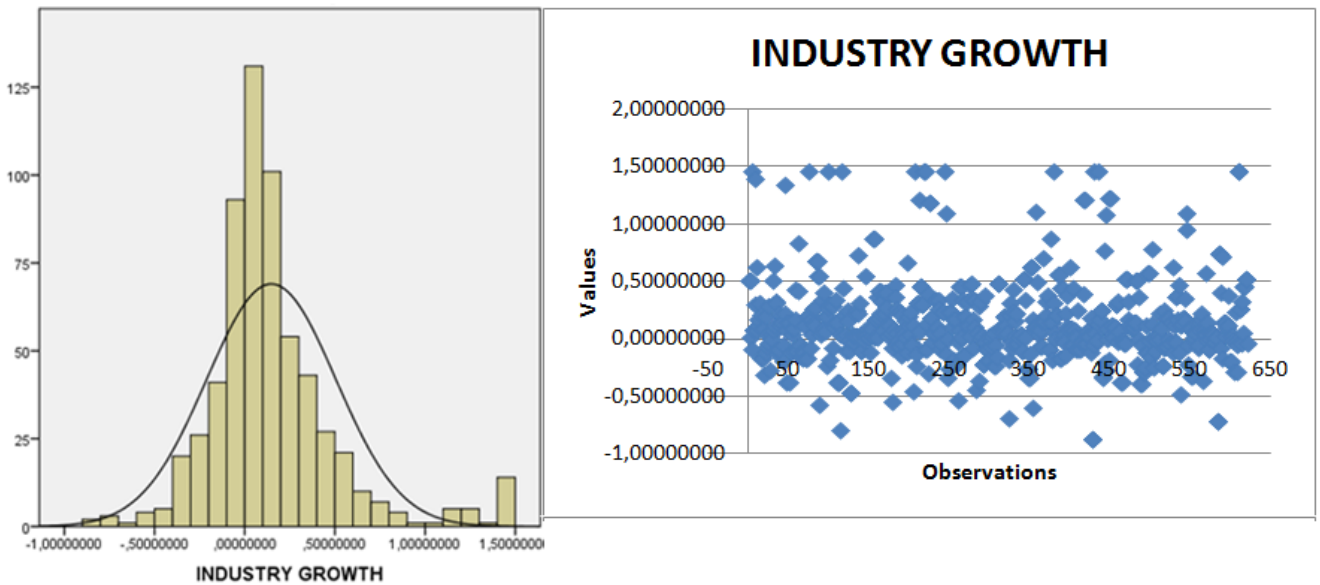Graph A3: INTANGIBLE/ASSETS Distribution

Graph A4: INDUSTRY MES Distribution

Graph A5: INDUSTRY CONCENTRATION Distribution

Graph A6: INDUSTRY GROWTH Distribution

7.2. Appendix A2 – Calculations of Odds Ratio in Details

Following the example provided by Field (2009), this section will explain how odds ratios are computed. In order to calculate odds ratios, resulting from a unit change in the explanatory variable, it is necessary to calculate the odds of a firm, which expands externally, before and after the unit change in the explanatory variable taken into account. Thereafter, with the results obtained, it is possible to compute the proportionate change in the two odds. The formulas below show the steps to compute the odds.

$$odds = \frac{P(event)}{P(no\ event)}$$

$$P(event) = \frac{1}{1 + e^{-(b0+b1X1)}}$$

$$P(no\ event) = 1 - P(event)$$

In the aforementioned equations the variable (b0) stands for the intercept, (b1) stands for the coefficient of the explanatory variable used, and (X1) stands for the explanatory variable itself. Those variables are provided by SPSS as outcome of logistic regression, together with the odds ratio, listed as *Exp(B)*, automatically computed by the software.

In order to explain how the odds ratio is computed, a logistic regression example is provided, which has DumMA for the dependent variable and EBITDA/ASSETS for the independent variable. Table A1 below shows the outcomes obtained from SPSS.

Table A1: SPSS Output

DUMMA[a]	B	Error std	Wald	df	Sig.	Exp(B)
Intercept	,042	,062	,456	1	,500	
EBITDA/ASSETS	2,342	,280	69,965	1	,000	10,406

a. reference category equal to 0

In this example (b0) takes the value of 0,042, while (b1) takes the value of 2,342. Those (b0) and (b1) estimate a liner regression line, which defines the relation between the independent variable EBITDA/ASSETS and the dependent variable DumMA. It is worth highlighting that the coefficients (b0) and (b1), follow the same interpretation used in linear regression. Thus, the slope coefficient represents the change in the dependent variable, given the increase of the independent variable (X) by one unit (Field, 2009). The outcomes provided by SPSS in Table A1 above will be plugged in the aforementioned formulas to compute the odds. Hence, the following results are obtained:

$$odds = \frac{0,511}{0,489} = 1,045$$

$$P(event) = \frac{1}{1 + e^{-(0,042+2,342 \, x \, 0)}} = 0,511$$

$$P(no \; event) = 1 - 0,511 = 0,489$$

The same steps reported above will be repeated after the independent variable has been increased by one unit, from zero to one. The results reported below show the odds of a firm, which expands externally after a unit change in the independent variable EBITDA/ASSETS.

$$odds = \frac{0,916}{0,084} = 10,905$$

$$P(event) = \frac{1}{1 + e^{-(0,042+2,342 \, x \, 1)}} = 0,916$$

$$P(no \; event) = 1 - 0,916 = 0,084$$

After the odds before and after a unit change in the explanatory variable have been computed, it is possible to derive the odds ratio by dividing the odds after the unit change by the odds before the unit change. The actual outcome is reported below, which is equal to 10,435.

$$\Delta odds = \frac{10,905}{1,045} = 10,435$$

The odds ratio manually computed, which is equal to 10,435, is very close to the outcome derived by SPSS, *(Exp(B)),* which amounts to 10,406. The discrepancy between the two values might be given by rounding errors.

Concerning the interpretation of the odds ratio, a value greater than 1 suggests that as the explanatory variable increases, the probability the analyzed event will happen increases. On the other hand, a value which is smaller than 1 suggests that as the explanatory variable increases, the probability the analyzed event will happen decreases.

7.3. Appendix A3 – Table of Pearson's Correlation

Table A2: Pearson's Correlation

Correlations

		EBITDA/ASSETS	CASH/ASSETS	INTANGIBLE/ASSETS	INDUSTRY MES	INDUSTRY CONCENTRATION	INDUSTRY GROWTH	DUMMA
EBITDA/ASSETS	Correlation Pearson	1	-,001	,009	,267**	-,060*	,047	,150**
	Sig. (2-code)		,983	,763	,000	,036	,097	,000
	N	1240	1240	1240	1238	1240	1240	1240
CASH/ASSETS	Correlation Pearson	-,001	1	-,194**	-,092**	-,056*	,003	-,005
	Sig. (2-code)	,983		,000	,001	,047	,923	,858
	N	1240	1240	1240	1238	1240	1240	1240
INTANGIBLE/ASSETS	Correlation Pearson	,009	-,194**	1	,049	,003	,023	,126**
	Sig. (2-code)	,763	,000		,082	,924	,417	,000
	N	1240	1240	1240	1238	1240	1240	1240
INDUSTRY MES	Correlation Pearson	,267**	-,092**	,049	1	,004	,043	,619**
	Sig. (2-code)	,000	,001	,082		,901	,132	,000
	N	1238	1238	1238	1238	1238	1238	1238
INDUSTRY CONCENTRATION	Correlation Pearson	-,060*	-,056*	,003	,004	1	-,032	-,005
	Sig. (2-code)	,036	,047	,924	,901		,259	,866
	N	1240	1240	1240	1238	1240	1240	1240
INDUSTRY GROWTH	Correlation Pearson	,047	,003	,023	,043	-,032	1	,060*
	Sig. (2-code)	,097	,923	,417	,132	,259		,034
	N	1240	1240	1240	1238	1240	1240	1240
DUMMA	Correlation Pearson	,150**	-,005	,126**	,619**	-,005	,060*	1
	Sig. (2-code)	,000	,858	,000	,000	,866	,034	
	N	1240	1240	1240	1238	1240	1240	1240

**. Correlation significant at 0,01 (2-code); *. Correlation significant at 0,05 (2-code).

7.4. Appendix A4 – Testing for Multicollinearity

Table A3: Variance Inflation Factors

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
EBITDA/ASSETS	1	1	1	1,078	1,082	1,083
CASH/ASSETS		1	1,039	1,047	1,051	1,051
INTANGIBLE/ASSETS			1,039	1,040	1,040	1,041
INDUSTRY MES				1,088	1,088	1,089
INDUSTRY CONCENTRATION					1,007	1,008
INDUSTRY GROWTH						1,005

Table A3 above shows the results of the multicollinearity analysis obtained from SPSS. The Variance Inflation Factors (VIF), reported in Table A3, measure the degree of multicollinearity. In case of high multicollinearity independent variables would be strongly correlated with each other. This would incur in high Variance Inflation Factors, which would exceed the threshold of 10, suggested by Field (2009). However, as Table A3 shows, the VIFs in all Models suggest that multicollinearity is not present.